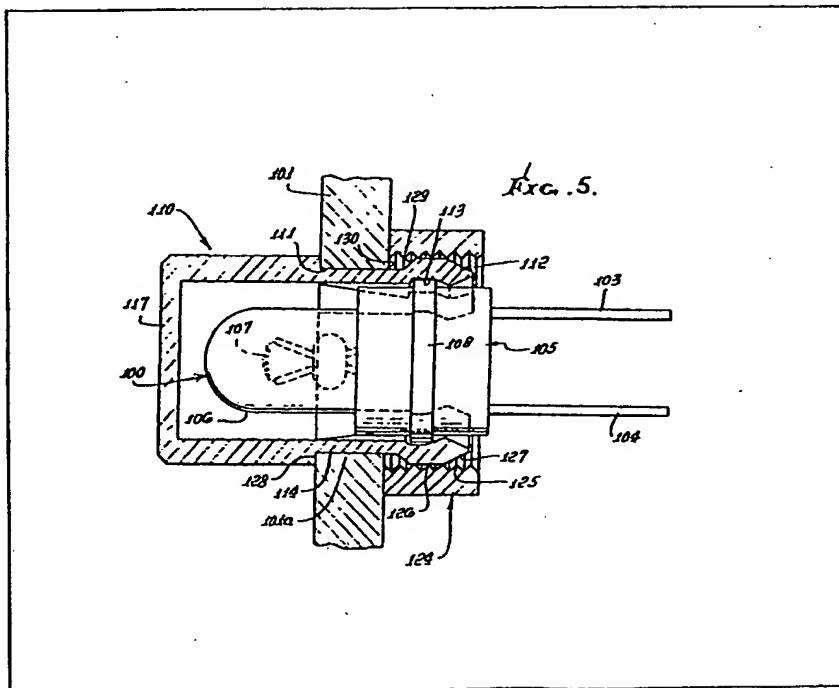


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GB 1440720  
GB 1383548  
GB 1224570  
GB 786503  
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(71) Applicant  
John Michael Savage, JR.  
8118 W. 83rd Street,  
Apt.C, Playa del Rey,  
California 90291,  
United States of America  
(72) Inventor  
John Michael Savage, JR.  
(74) Agents  
Graham Watt & Co.

(54) Panel-mounted indicator lamp

(57) A light emitting assembly attachable to a display panel (101) includes clip means defining spring fingers (112) projecting rearwardly at the side of a light source as for example an LED neon tube or filament bulb 100. The fingers define first grooves (113) to receive a boss (108) on the light source, and second grooves (114) to receive portions of the display panel adjacent a panel opening (111) into which the clip member is inserted. The spring fingers also define first cam surfaces (120) rearwardly of the first grooves and angled to be spread by the light source boss in response to forward insertion of the source through the clip member and into a lens cap (110) integral with the clip means. Masks may be employed between adjacent caps arranged in a row.



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The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

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FIG. 1.

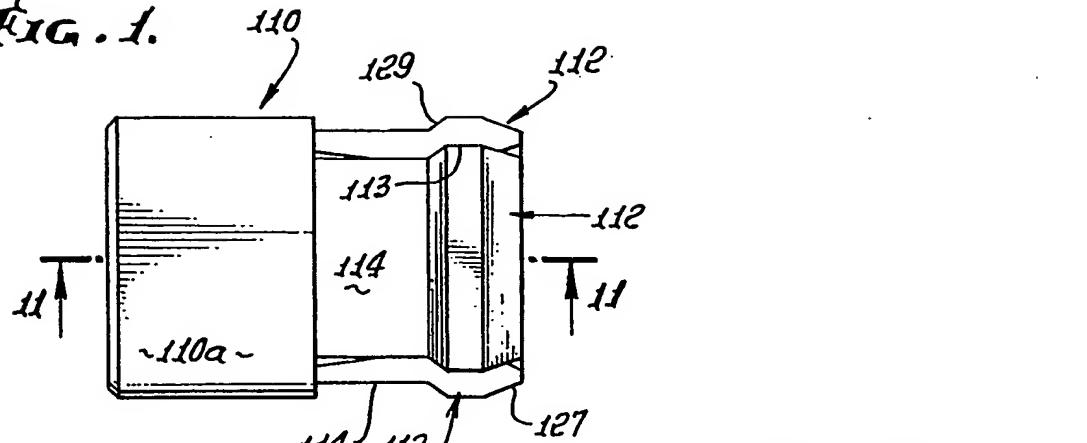


FIG. 2.

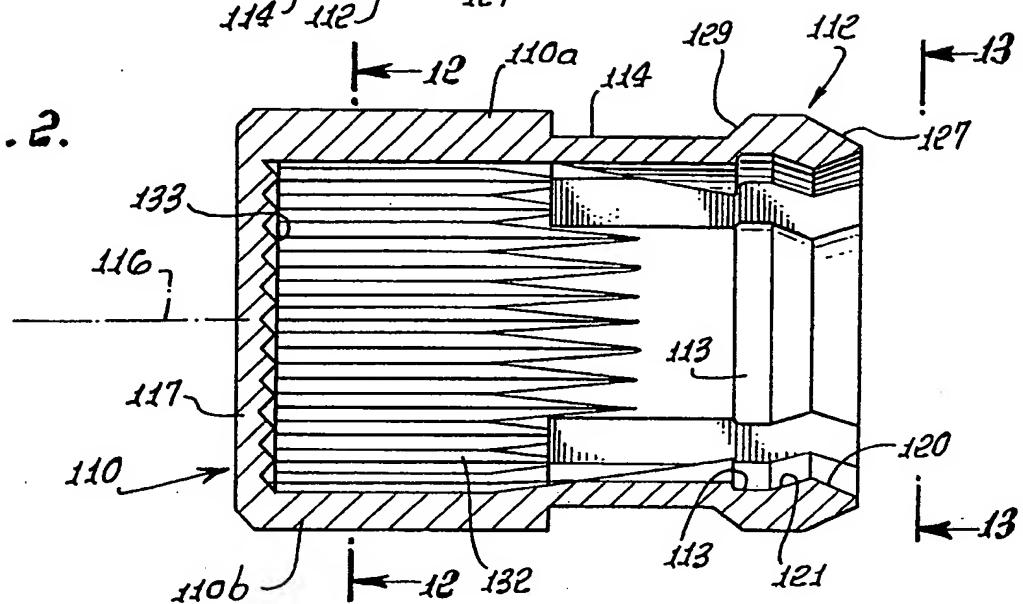


FIG. 3.

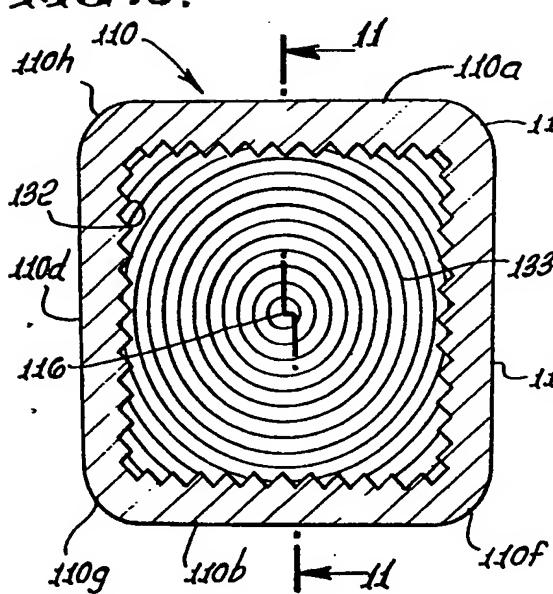
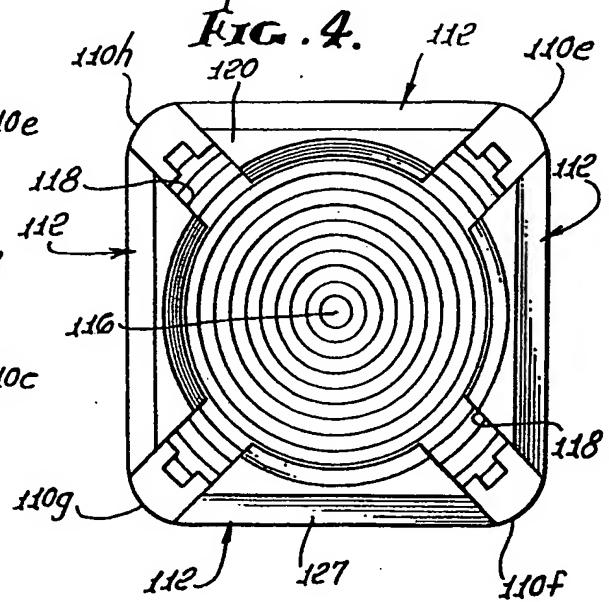


FIG. 4.



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FIG. 5.

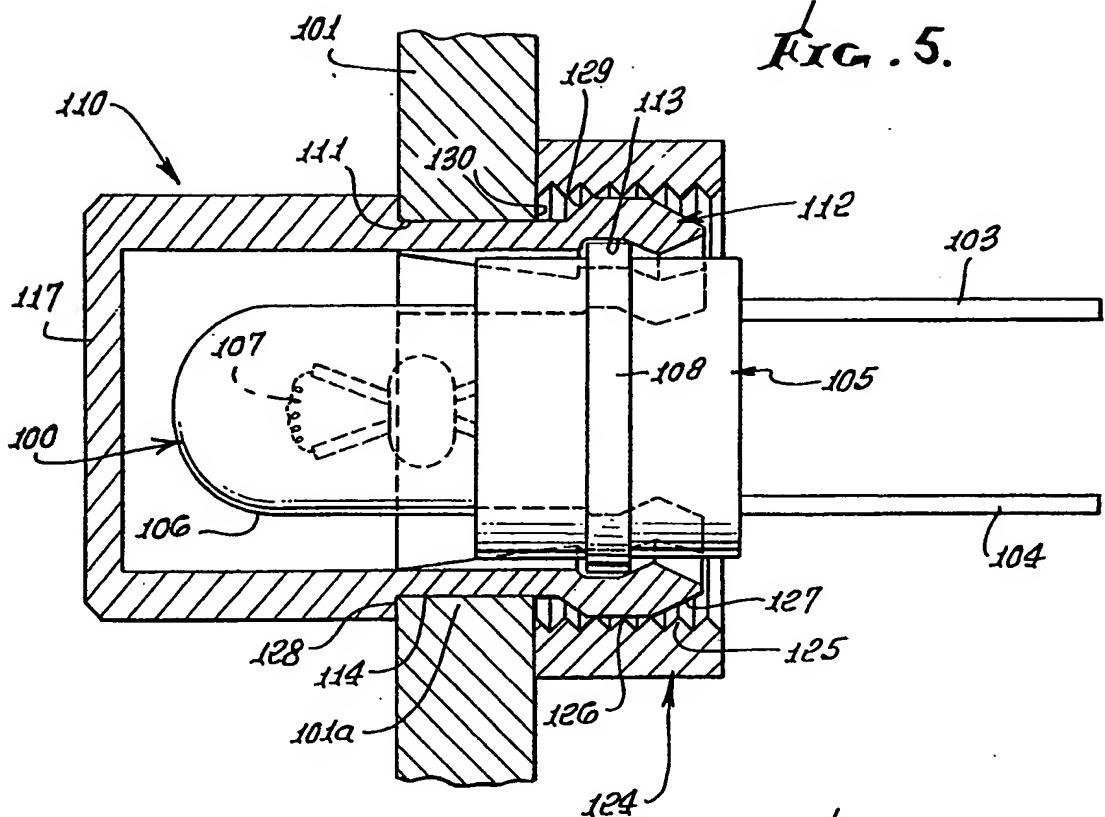


FIG. 6.

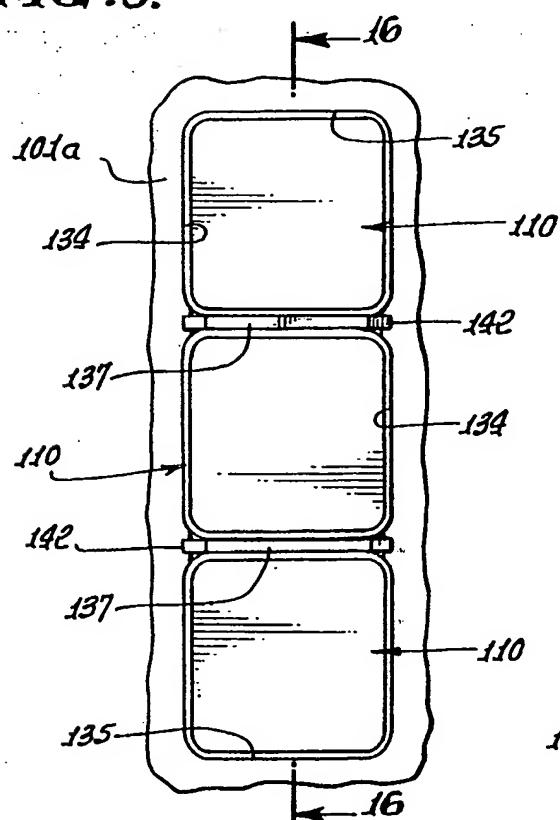


FIG. 7.

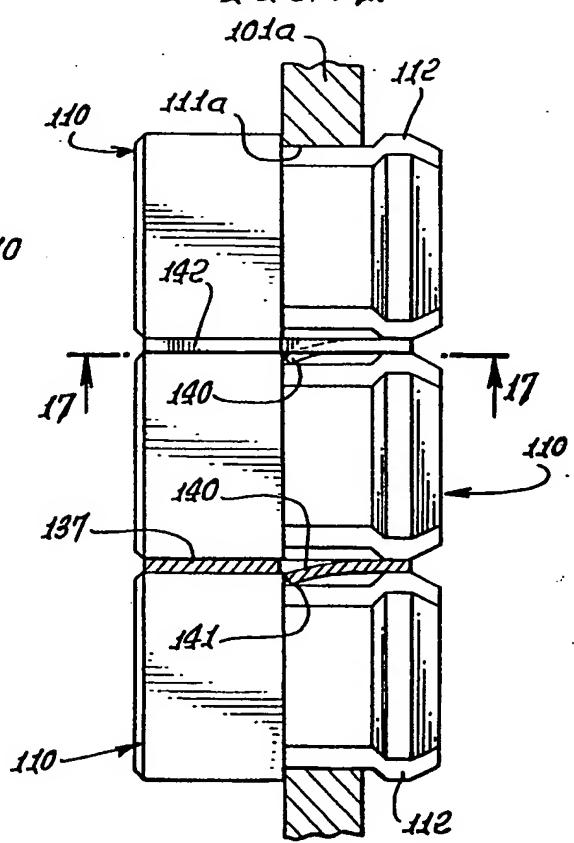


FIG. 8.

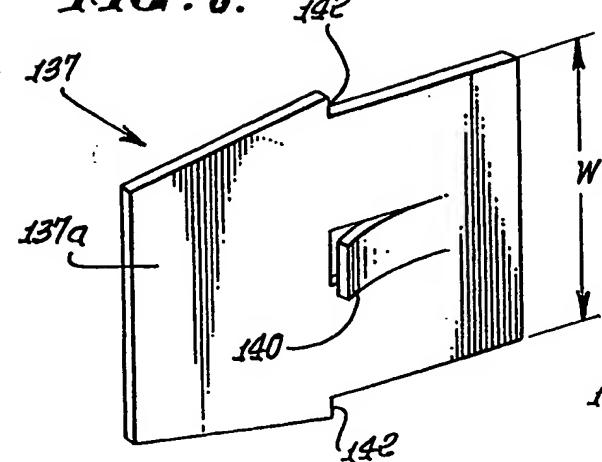


FIG. 10.

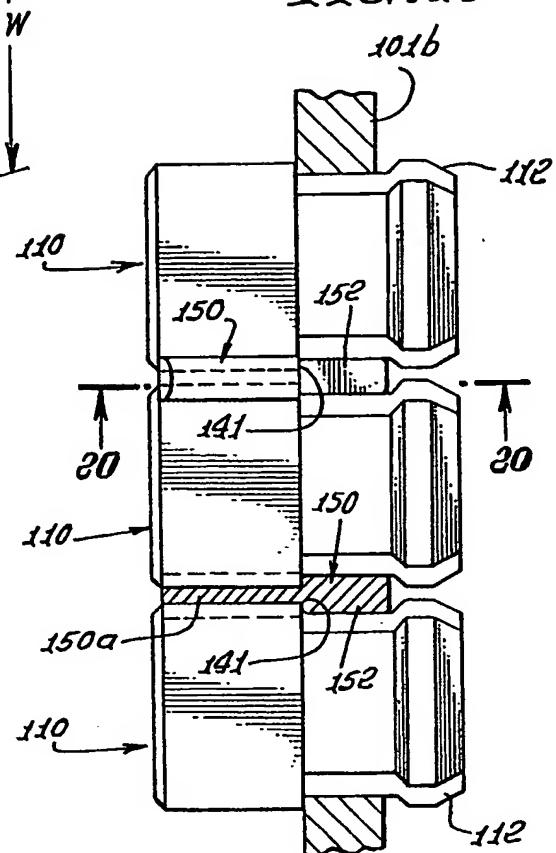


FIG. 9.

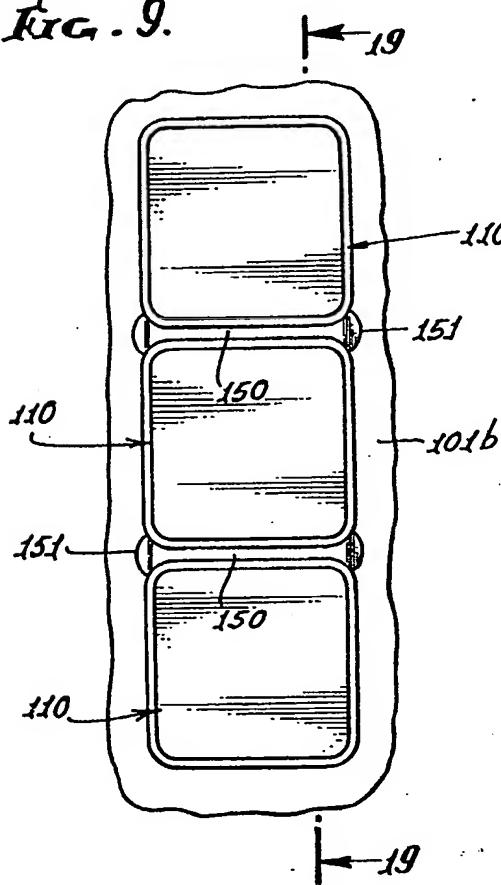
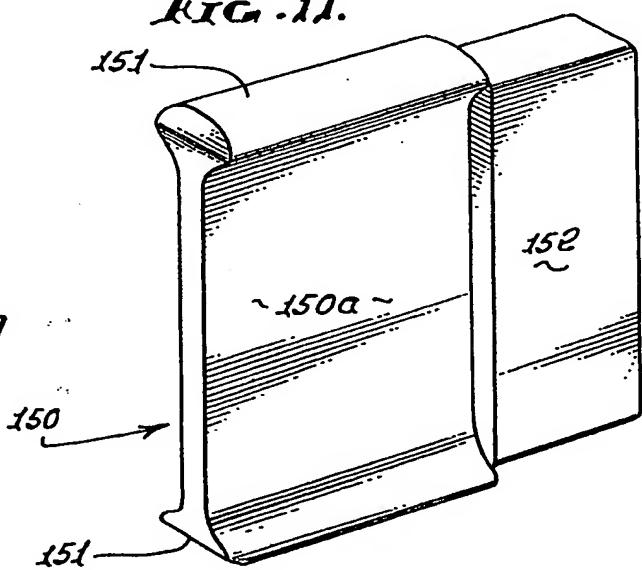


FIG. 11.



**SPECIFICATION****Lens clip and cap for led or light unit assembly**

5 This invention relates generally to a light emitting assembly and more specifically, it concerns the installation or mounting of such devices to overcome prior problems and difficulties.

In the past, LEDs (light emitting diodes) have been 10 permanently mounted within housings, and the latter were in turn attached or mounted to display panels. The construction was such that removal and replacement of the diodes was made quite difficult. U.S. Patent 3,887,803 discloses one way in which to 15 more readily remove a diode from its housing; however, such removal necessitated prior detachment of a lens cap. Also, ready removal of the housing itself from the display panel remained a problem. Further, attachment of the diode to its 20 housing, and the housing to the display panel, in the unusually advantageous manner as now afforded by the invention, were not known.

It is a major object of the invention to provide an assembly offering a solution to the above as well as 25 other difficulties with prior LED installations, enabling ready installation and/or replacement of diodes and diode housings in display panels. The invention also extends to assemblies incorporating incandescent type light units. Further, the invention increases 30 the light pattern, gaining the viewer's attention more rapidly, and enhancing aesthetic effect. Basically, the assembly of an embodiment of the present invention comprises:

- a) a light unit such as an emitting diode or 35 incandescent light unit having locking structure thereon,
- b) a lens cap receiving the unit and clip means integral with the cap and projecting proximate the unit locking structure, and
- c) a retainer urging said clip means into interfitting relation with said locking structure.

As will be seen, the lens cap typically projects forwardly at one side of the display panel, and the clip means in the form of spring fingers projects 45 through an opening in the panel to releasably interfit the locking structure; and the retainer typically comprises a ring received on the rearwardly projecting fingers to hold them in interfitting relation with the unit, at the opposite side of the panel.

50 Further, the spring fingers and locking structure may have tongue and groove interfit defined by an annular boss on the unit and first grooves in the spring fingers and presented radially inwardly; the spring fingers may define first cam surfaces angled 55 to be radially spread by the boss in response to forward insertion of the unit into the cap; second cam surfaces angled to be radially spread by the boss in response to rearward retraction of the unit from the cap; third cam surfaces angled to be urged 60 radially inwardly in response to rearward insertion of the spring fingers through the panel opening; and fourth cam surfaces angled to be urged radially inwardly in response to forward retraction of the fingers through the panel opening. In addition, the 65 fingers typically define second grooves to receive

portions of the display panel adjacent the panel opening, to retain the fingers and cap in place.

The present invention is a light emitting assembly attachable to a display panel, characterised by an electric lamp or light emitting diode having locking structure thereon, said structure comprising a boss, a lens cap for receiving the diode or the lamp forwardly therein, clip means integral with the cap and projecting sidewardly to lie proximate the diode locking structure, said clip means defining spring fingers to project rearwardly at the side of the diode or lamp, the fingers defining first grooves to receive the boss on the diode or lamp and second grooves to receive portions of a display panel adjacent an opening formed therein, and wherein the spring fingers define first cam surfaces rearwardly of the first grooves and angled to be radially spread by the diode or lamp boss in response to forward insertion of the diode into the cap, and the cap defines a forward axis and has opposite exterior side walls which are substantially flat and parallel.

An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawings in which:-

- 90 *Figure 1* is a side elevation showing a lens cap;  
*Figure 2* is an enlarged vertical section taken on lines 11-11 of *Figure 1*;  
*Figure 3* is a vertical section taken on lines 12-12 of *Figure 2*;
  - 95 *Figure 4* is an end view on lines 13-13 of the Figure 2 cap;  
*Figure 5* is a side elevation, partly in section, showing the embodiment of the light emitting assembly installed in a panel;
  - 100 *Figure 6* is a frontal elevation showing multiple caps of *Figure 1* form installed in a panel;  
*Figure 7* is a section on lines 16-16 of *Figure 6*;  
*Figure 8* is a perspective view of a light mask as incorporated in Figures 6 and 7;
  - 105 *Figure 9* is a front elevation showing multiple caps of *Figure 1* form installed in a panel, but with modified light masks between lens caps;  
*Figure 10* is a section on lines 19-19 of *Figure 9*; and
  - 110 *Figure 11* is a perspective view of the light stop employed in Figures 9 and 10.
- Figure 5* shows a light unit 100 attached to panel 101, and having terminals 103 and 104 projecting rearwardly from body 105 to which transparent envelope 106 is attached to project leftwardly (forwardly). A resistive component, such as wire 107, within the envelope is adapted to be electrically energized to incandescence, to define a light emitting zone. Unit 100 also includes locking structure 115 such as annular boss or flange 108 at the rearward side of panel 101. The unit might alternatively take the form of the LED unit, or a Neon bulb.
- The illustrated assembly also includes a lens cap 110 receiving the envelope 106, and a clip member 125 or means integral with the cap projecting proximate the light unit locking structure. Cap 110 projects axially at the front side of the panel, and the envelope 106 projects axially forwardly through an opening 111 in the panel 101, and within the cap, 130 also at the front side of the panel. The clip means

may comprise spring fingers 112 projecting rearwardly through opening 111 at the rearward side of the envelope 106; further, the fingers have tongue and groove interfit with the light unit. For example, 5 boss 108 is received into first grooves 113 defined by cantilevered extents of the fingers projecting rearwardly of the panel. The fingers also define second grooves 114 receiving portions 101a of the panel adjacent rectangular or square opening 111.

10 In this regard, it will be observed that the cap defines a forward axis 116 (see Figures 3-4), and has opposite exterior side walls, at least two of which are substantially parallel and flat. See for example walls 110a and 110b, and/or walls 110c and 110d. The 15 outer sides of these walls are flat, as shown, and they are joined at corners 110e—110h which are locally rounded, as shown. The cap is generally rectangular, and preferably square, in external outline or cross section normal to axis 116. The end wall 20 117 of the cap is also flat, and perpendicular to axis 116. There are, correspondingly, four fingers 112, each in general rearward alignment with one of the cap walls, as is clear from Figures 3 and 4. The outer walls of the fingers are flat, whereas their inner sides 25 are circularly arcuate, about axis 116. Slits 118 separate the fingers, the slits located in rearward alignment with the cap corners 110e—110h referred to. Grooves 114 are, accordingly, flat as is clear from Figures 1 and 2, whereas grooves 113 are arcuate.

30 The fingers further define first arcuate cam surfaces 120 located rearwardly of the grooves 113 to be radially spread by boss 108 in response to forward insertion of the light unit into the cap. Surfaces 120 are angled rearwardly and radially 35 outwardly as shown. In addition, the fingers define second arcuate cam surfaces 121 immediately rearwardly of the grooves 113, and angled rearwardly and radially inwardly to be radially spread apart by the boss 108 in response to relatively rearward 40 retraction of the light unit from the cap.

Retention of the boss 108 in grooves 113 is assured by retainer ring 124 having a generally square cross section, with four sets of serrations 125 in frictional engagement with the respective four 45 fingers, at locations 126.

The fingers also define third cam surfaces 127 rearwardly of grooves 114, and angled rearwardly and radially inwardly to be urged radially inwardly by edge portions 128 of the panel in response to 50 rearward installation of the fingers through opening 111. Also, the fingers define fourth cam surfaces 129 rearwardly of and adjacent to grooves 114. Surfaces 129 are angled rearwardly and radially outwardly to be urged inwardly by edge portions 130 of the panel 55 in response to forward retraction of the fingers through opening 111; however, surfaces 129 normally block such retraction until the fingers are inwardly collapsed. Accordingly, the fingers accommodate ready installation of the lens cap 110 to a 60 panel with a rectangular or square opening 111, as well as ready removal of the cap from the panel, without the light unit being located within the cap; and ready installation of the light unit into the installed cap as well as ready removal of the unit 65 from the installed cap.

Cap 110 may consist of plastic material, and is shown in Figure 5 without interior serrations. The serrations shown at 132 and 133 in Figures 2-4 refract the light transmitted through the cap to 70 provide increased luminosity at local areas of the cap when viewed from the exterior. The opposed walls of each serration rib are inclined at approximately 90°.

Figures 6 and 7 show a row of three caps 110 installed in panel 101a. Note the straight side walls 134 of the opening 111a receiving the caps, as well as straight parallel end walls 135. At least two fingers 112 of each cap engage panel walls, for retention. The caps extend proximate or adjacent one another 80 in the row, and light masks may be installed between the caps, i.e. in the slight gaps between them. The masks are illustrated at 137, and as further seen in Figure 8. They may consist of opaque plastic material to block light transmission between the caps. A 85 tang 140 extends sidewardly from the flat body of the mask to engage the underside of the cap, at 141 in Figure 7, which overhangs a groove 114, whereby the mask is held in position against inadvertent removal. In addition, mask tangs 142 seat on the 90 edge portion of the panel adjacent edges 134. The width "w" of the lower portion of the mask is such that it fits nicely in the space between edges 134. Mask tapered portion 137a is located between the caps 110 to block light transmission.

95 In Figure 9, the caps 110 are arranged in a row in an opening in the panel 101b, with modified masks 150 between them. Such masks are better shown in Figure 11 as having enlargements 151 at opposite ends of body portions 150a, the enlargement filling 100 the space between curved corners of the caps. Mask lower portions 152 are enlarged to fit against cap undersides 141, blocking withdrawal of the masks from between the caps. Enlargements fit against the top edges of the panel opening. Accordingly, efficient arrangement of caps in side-by-side relation 105 may be made, with light masks therebetween, whereby selective lighting of areas (without noticeable discontinuities) may be achieved.

110 CLAIMS

1. A light emitting assembly attachable to a display panel, characterised by an electric lamp or light emitting diode having locking structure thereon, said structure comprising a boss, a lens cap for receiving the diode or the lamp forwardly therein, clip means integral with the cap and projecting sidewardly to lie proximate the diode locking structure, said clip means defining spring fingers to 115 project rearwardly at the side of the diode or lamp, the fingers defining first grooves to receive the boss on the diode or lamp and second grooves to receive portions of a display panel adjacent an opening formed therein, and wherein the spring fingers 120 define first cam surfaces rearwardly of the first grooves and angled to be radially spread by the diode or lamp boss in response to forward insertion of the diode into the cap, and the cap defines a forward axis and has opposite exterior side walls 125 which are substantially flat and parallel.

2. An assembly as claimed in claim 1 wherein the cap has a generally rectangular external cross-section in planes normal to said axis.
3. An assembly as claimed in claim 1 or 2
- 5 wherein said fingers are separated by forwardly extending slits rearwardly of corners defined by said cap generally rectangular external cross-section.
4. An assembly as claimed in claim 1, 2 or 3 wherein the fingers further define second cam
- 10 surfaces rearwardly of the first grooves and angled to be radially spread by said boss in response to rearward retraction of the diode or the lamp from the cap.
5. An assembly as claimed in any preceding
- 15 claim wherein the lens cap defines opposite interior side walls defining axially extending serrations, the cap being translucent.
6. An assembly as claimed in claim 5 wherein the lens cap has an interior front end wall defining
- 20 radially spaced serrations which extend circularly about said forward axis.
7. An assembly as claimed in any preceding claim further comprising a retainer having the form of a ring for receiving the clip means at the opposite
- 25 side of a panel from the lens cap.
8. An assembly as claimed in claim 6 wherein the retainer ring has serrations to lie in frictional engagement with the spring fingers, and the fingers define grooves releasably to receive said annular boss,
- 30 inwardly of the ring.
9. An assembly as claimed in claim 7 or 8 in combination with a panel having an opening therethrough, said lens cap interfitting the panel and projecting into said opening and being secured and
- 35 retained therein by the diode or lamp, which is received forwardly in the lens cap, and by said retainer receiving said clip means at the opposite side of the panel from the lens cap.
10. A combination as claimed in claim 9 wherein
- 40 the retainer engages the panel.
11. A combination as claimed in claim 9 or 10 including a plurality of said light emitting assemblies having multiple lens caps interfitting the panel and projecting into said opening, said caps extending in
- 45 a row along said opening, and there being a light mask between each adjacent pair of caps.
12. A combination as claimed in claim 11 wherein said masks include tangs interfitting said caps to position the masks.
- 50 , 13. A combination as claimed in claim 11 wherein the masks include enlargements adjacent exterior corners defined by said caps.
- , 14. A light emitting assembly attachable to a display panel substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.